

# **9th International Workshop on Personal Computers and Particle Accelerators**

**(PCaPAC 2012)**

**Kolkata, India  
4-7 December 2012**

ISBN: 978-1-63266-484-6

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

***License***

This work is licensed under a Creative Commons Attribution 3.0 Unported license:  
<http://creativecommons.org/licenses/by/3.0/>

**You are free to:**

Share - Copy and redistribute the material in any medium or format.  
Adapt – Remix, transform, and build upon the material for any purpose, even commercially.  
The licensor cannot revoke these freedoms as long as you follow the license terms.

**Under the following terms:**

Attribution – You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

Printed by Curran Associates, Inc. (2014)

Published by:

JACoW - Joint Accelerator Conferences Website  
c/o Christine Petit-Jean-Genaz  
CERN BE  
CH - 1211 Geneva 23

Phone: 41 22 767 32 75  
[christine.petit-jean-genaz@cern.ch](mailto:christine.petit-jean-genaz@cern.ch)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## Contents

<b>Preface</b>	<b>i</b>
Foreword . . . . .	iii
Contents . . . . .	v
Committees . . . . .	ix
<b>Papers</b>	<b>1</b>
WEKA01 – The CSS Story . . . . .	1
WEIC01 – Web2cToGo: Bringing the Web2cToolkit to Mobile Devices . . . . .	4
WECC02 – EPICS Channel Access Using WebSocket . . . . .	7
WECC03 – Qt Based GUI System for EPICS Control Systems . . . . .	10
WEPD01 – Data Logging System Upgrade for Indus Accelerator . . . . .	12
WEPD03 – Control System Studio Archiver with PostgreSQL Backend: Optimizing Performance and Reliability for a Production Environment . . . . .	15
WEPD09 – Fast Data Acquisition System for Booster Supplies Readback . . . . .	18
WEPD10 – Embedded CAMAC Controller: Hardware/Software Co-optimization for High Throughput . . . . .	20
WEPD11 – Client Server Architecture Based Embedded Data Acquisition System on PC104 . . . . .	23
WEPD12 – A Large Channel Count Multi Client Data Acquisition System for Superconducting Magnet System of SST-1 . . . . .	26
WEPD13 – Serial Multiplexed Based Data Acquisition and Control System . . . . .	29
WEPD14 – VEPP-2000 Logging System . . . . .	32
WEPD16 – Development of Data Acquisition Software for VME Based System . . . . .	35
WEPD18 – Microcontroller Based DAQ System for IR Thermography by Hot and Cold Water Flow . . . . .	37
WEPD19 – Smart Structured Measurement Process for Versatile Synchrotron Beamline Data at ANKA . . . . .	40
WEPD22 – Post-Mortem Analysis of BPM-Interlock Triggered Beam Dumps at PETRA-III . . . . .	43
WEPD23 – Design & Implementation Of LabVIEW <sup>TM</sup> Based GUI for Remote Operation and Control of Excimer Laser for Plasma Wakefield Accelerator Experiment . . . . .	46
WEPD24 – STARS on Android . . . . .	51
WEPD25 – Development of EPICS Channel Access Embedded ActiveX Components for GUI Development . . . . .	54
WEPD26 – Development of Fast Controls for Beam Wire Scanner for SuperKEKB . . . . .	57
WEPD27 – Graphical User Interface (GUI) for Testing CAMAC modules . . . . .	60
WEPD28 – Re-envisioning the Operator Consoles for Dhruva Control Room . . . . .	62
WEPD33 – Embedded PC Based Controller for Use in VME Bus Based Data Acquisition System . . . . .	65
WEPD34 – A Low-Cost High-Performance Embedded Platform for Accelerator Controls . . . . .	68
WEPD38 – A wireless control system for the HTS-ECRIS, PKDELIS and low energy beam transport . . . . .	71
WEPD39 – Development of an Ethernet Enabled Microcontroller Based Module for Superconducting Cyclotron ECR Beamline Control . . . . .	73
WEPD43 – A New Scheme for Direct Estimation of PID Controller Parameters . . . . .	76
WEPD44 – FPGA Data Block FIFO for the APS ID Measurement System . . . . .	79
WEPD47 – Low-cost EPICS Control Using Serial-LAN Module XPort . . . . .	81
WEPD48 – Facility-Wide Synchronization of Standard FAIR Equipment Controllers . . . . .	84
WEPD52 – Diamond Light Source Control Systems Relational RDB . . . . .	87
THIA02 – Current Status and Upgrade Plan of the Data-Acquisition System at SACLA . . . . .	90
THIA03 – The IUAC Tandem-LINAC Control System . . . . .	94
THCA04 – An Update on ConSys Including a New LabVIEW FPGA Based LLRF System . . . . .	97
THCA05 – PLC-based Control System for 10 MeV Linear Accelerator at EBC Kharghar, BARC . . . . .	100
THCA06 – Status of the Ultra Fast Tomography Experiments Control at ANKA . . . . .	103
THCB01 – HyperArchiver: an Evolution of EPICS Channel Archiver . . . . .	106
THCB02 – EPICS MySQLArchiver - Integration Between EPICS and MySQL . . . . .	109
THCB03 – Using Memcached as Real-time Database in the SPARC Control System . . . . .	112
THIB04 – Control System Interoperability, an Extreme Case: Merging DOOCS and TINE . . . . .	115
THIC01 – Tango for Experiment Control . . . . .	118
THCC02 – Controls Architecture for the Diagnostic Devices at the European XFEL . . . . .	121
THCC03 – PC Based Real Time Data Exchange on 10GbE Optical Network Using RTOS . . . . .	124
Contents	v

THCD04 – Master Slave Topology Based, Remotely Operated, Precision X-ray Beam Profiler and Placement System for High Pressure Physics Experiment at Indus-2 Beam Line . . . . .	128
THCD05 – A Flexible and Testable Software Architecture: Applying Presenter First to a Device Server for the DOOCS Accelerator Control System of the European XFEL . . . . .	131
THCD06 – Design Development and Analysis of a Comprehensive Open Source System for Proactive Management of Security Aspects of a Control Network . . . . .	134
THPD02 – What it Takes to Make a System Reliable . . . . .	139
THPD03 – PLC Controlled Search & Secure Safety Interlock System for Accelerator . . . . .	142
THPD04 – Machine Throughput Improvement Achieved Using Innovative Control Technique . . . . .	144
THPD05 – Design and Analysis of Second Harmonics Modulator for DC Current Transformer . . . . .	145
THPD06 – FLogbook: From Concept to Realization . . . . .	148
THPD09 – Development of a Monitoring System for the FL-net Protocol . . . . .	151
THPD10 – Modular Beam Diagnostics Instrument Design for Cyclotrons . . . . .	154
THPD11 – Facility Monitoring System using Storage Area Network for VEC and SCC . . . . .	157
THPD12 – Design and Implementation of an IEEE 802.15.4/ZigBee based Star Network for Data Acquisition and Monitoring . . . . .	160
THPD13 – SocketCAN Device Support for EPICS IOCs . . . . .	163
THPD14 – Status of the Migration of the S-DALINAC Accelerator Control System to EPICS . . . . .	166
THPD15 – Multichannel High Voltage Power Supply Controls Solution Using Compact Distributed Ethernet Based Boards and Qt Based GUI . . . . .	169
THPD16 – Fast Digital Feedback Control Systems for Accelerator RF System using FPGA . . . . .	172
THPD17 – API Manager Implementation and its Use for Indus Accelerator Control . . . . .	175
THPD18 – Adaptive Fuzzy Control for Transfer Channels in Particle Accelerators . . . . .	178
THPD19 – Drive System Control for Kolkata Superconducting Cyclotron Extraction System . . . . .	181
THPD20 – RF Distribution and Control System for Accelerators of the VEC-RIB Facility . . . . .	184
THPD21 – Testing of Inductive Output Tube based RF Amplifier for 650 MHz SRF Cavities . . . . .	187
THPD22 – Controls for a 10 Petawatt Class Laser Facility . . . . .	190
THPD26 – Integrated Control System for LEHIPA . . . . .	192
THPD27 – Control Scheme for Remote Operation of Magnet Power Supplies for Infrared Free Electron Laser . . . . .	195
THPD28 – A Distributed CAN Bus Based Embedded Control System for 750 keV DC Accelerator . . . . .	197
THPD30 – High Voltage Controller System for Spectroscopy Diagnostics of SST-1 . . . . .	200
THPD32 – Progress of the JINR e-Linac Accelerator Test-Bench Control Systems . . . . .	203
THPD33 – Qt Based Control System Software for Low Energy Accelerator Facility . . . . .	206
THPD35 – Modeling and Simulation of Indus-2 RF Feedback Control System . . . . .	208
THPD36 – An Embedded System Based Computer Controlled Process Automation for Recovery and Purification of $^{99m}\text{Tc}$ from $(n, \gamma)^{99}\text{Mo}$ . . . . .	211
THPD40 – Instrumentation Architecture for ITER Diagnostic Neutral Beam Power Supply System . . . . .	214
THPD43 – Electron Cyclotron Resonance Ion Source Control System . . . . .	217
THPD44 – The CS framework as a Control System for the HITRAP Facility at GSI . . . . .	219
THPD45 – Overview of Control System for 30MeV RF Source . . . . .	222
THPD46 – Simulation Analysis of Analog IQ based LLRF Control of RF Cavity . . . . .	225
THPD47 – Introduction of Non-Standard EPICS Controllers . . . . .	227
THPD48 – Reachability in a Finite Distributed System Protocol Model by Backward Traversal . . . . .	230
THPD49 – Design Considerations for Development of Distributed Data Acquisition and Control System (DDACS) for Radio-active Ion Beam (RIB) Facility . . . . .	234
THPD50 – FPGA Based Amplitude Control System for Accelerating Cavities . . . . .	239
FRCA01 – The New White Rabbit Based Timing System for the FAIR Facility . . . . .	242
FRCA02 – Status Report, Future Plans and Maintenance Issues of VME Based Cryogenic Control System at IUAC . . . . .	245
FRCA03 – Development of the Car-borne Survey System KURAMA . . . . .	248
FRCA04 – Control System for BARC-TIFR Pelletron . . . . .	251
FRCB01 – Maintaining an Effective and Efficient Control System for the Electromagnetic Calorimeter of the Compact Muon Solenoid Experiment During Long-term CERN Large Hadron Collider Operations . . . . .	254
FRCB02 – Development of the Control System for PEFP 100-MeV Proton Linear Accelerator . . . . .	257
FRCB03 – RF Control System for 400 keV RFQ . . . . .	260

---

FRCB04 – VEPP-2000 Collider Control System . . . . .	263
FRCC01 – Design of the Data Acquisition System for the Nuclear Physics Experiments at VECC . . . . .	268
FRCC02 – A FPGA Based High Speed Data Acquisition Card . . . . .	271
FRCC03 – Development and Performance Analysis of EPICS Channel Access Server on FPGA based Soft-core Processor . . . . .	274
FRCC04 – Digital Pulse Processing Techniques for High Resolution Amplitude Measurement of Radiation Detector . . . . .	279
FRID01 – Introducing the ICHAOS Control Systems Framework . . . . .	282
FRCD02 – Process Control for Parallel Run of Two Helium Liquefiers at VEC Centre, Kolkata . . . . .	285
<b>Appendices</b>	<b>289</b>
List of Authors . . . . .	289
Institutes List . . . . .	293